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(54) VINYL POLYMER HAVING FUNCTIONAL GROUPS AT ENDS, METHOD FOR MANUFACTURING THE SAME, AND CURABLE COMPOSITION CONTAINING THE VINYL POLYMER HAVING FUNCTIONAL GROUPS AT ENDS

CO8L 61/28

(57)Abstract:

functional groups at its ends.

PROBLEM TO BE SOLVED: To provide a vinyl polymer having functional groups at its ends, in which physical properties such as elongation and tensile strength attributable to chain extension are well balanced with durability such as resistance to heat and water attributable to a network structure and, furthermore, in which resins different in composition are coupled into an AB-type block polymer usable for the manufacture of a viscous adhesive, sealer, elastic adhesive, paint, foam, film, thermoplastic elastomer, damping material, various molding materials, resin modifier or the like; a method for manufacturing the same; and a curable composition containing a vinyl polymer having

SOLUTION: The vinyl polymer having functional groups at its

X-R*N (R*)-F= (C, R*, R*, R*) =F=N (R*)-k*-A --(D

ends, the method for manufacturing the same, and the curable composition containing the vinyl polymer having functional groups at its ends involve formula (1), where X is - OH,-COOH, a silyl group, an alkenyl group, or an aryl group and P is a vinyl polymer whose ends connect to the end groups X through the intermediary of amine groups, etc., on both sides.

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Claim(s)] CLAIMS

Claim 1]A vinyl system polymer which has a functional group at the end expressed with a following

general formula (1). Formula 1]

K-R'-N (R')-P- (C, R', R2, R3) -P-N (R')-R3-X

hydrogen atom, And although either the alkyl group of the carbon numbara 1-6 replaced by 1 to three the carbon numbers 1-20, the cycloally! group of the carbon numbers 3-8, C(=Y) NR⁸R⁷, C(=Y) R⁸, a express an aliphatic group), a heterocyclyl group, an arallyl group, an ARARUKENIRU group. The slkyl X express the basis of either a hydroxyl group, "NRRT, a carboxyl group, a silyl group, a vinyl group, carbon atom or R1, R2 and R3, and R1, R2, and R3. Respectively Hydrogen, halogen, the alkyl group of with P, it joins together, Mean that P of another side has combined with either the above-mentioned an alkenyl group or an allyl group smong a formula, and P, Exprass independent or the copolymer of allyl group, an anyl group, a -Ar-mold, -(Ar-R)-mold aromatic ring, or -(R-Ar-R)-mold aromatic ring. an aryl group, a phenyl group, or benzyl, and R⁵, Either of the alkyl groups of the carbon numbers 1group, a vinyl group, and the benzene ring into the alkyl group of the carbon numbers 1-20, its main the annular group of 3 - 6 member, or has a side chain - 6 members was formed is expressed, R⁸ is an alkyl group of the carbon numbers 1-20, an alkoxy group of the carbon numbers 1-20, an aryloxy earboxylic acid chloride group, A hydroxyl group, a cyano radical, the alkenyl group of the carbon numbers 2–20, the alkynyl group of the carbon numbers 2–20, A oxilanyl group, a glycidyl group, an hydrogen, the alkyl group of the carbon numbers 1-6, the alkenyl group of the carbon numbers 1-6, straight chain, or the carbon numbers 1-20 of branching.] [Claim 2]A vinyl aystem polymer which has a functional group at the end expressed with a following side and the carbon atom of a polymer component or a copolymer component which are expressed chain, or a side chain is expressed, Y is NR9 or an oxygen atom, and NR6R7, The alkyl group of the numbers 2-5 is formed. The thing in which the annular group of 3 which forms a nitrogen atom and combined with the nitrogen atom, Or R⁶ and R⁷ join together, and the alkylene group of the carbon the vinyl system monomer in which a radical polymerization is possible, and (C, R1, R2, R3). In one However, the aromatic ring in which Ar has an aromatic ring or one or more substituents, and R group, or a heterocyclyl oxy group, and R⁹ expresses the alkyl group or aryl group of hydrogen, a 20 containing one or more the polar groups or aromatic rings which were chosen from the group which consists of an ester group, an amide group, an amino group, a urethane group, a sulfhydryl group of the carbon numbers 1-6 which until all replaced by the halogen atom from one of the carbon numbers 1–5 or the cycloalkyl group of the carbon numbers 1–5 which both \mathbb{R}^8 and \mathbb{R}^7 bases chosen from the group of the alkoxy group of the carbon numbers 1-4, an aryl group, a expressed, it is two or issa pieces that both R1 R2, and R3 can take hydrogen. R4 expresses heterocyclyl group, C(=Y) NR⁶R⁷, and C(=Y) R⁸, an OKIRANIRU group or a glycidyl group ia teneral formula (2). nttp://www4.ipdl.inpit.go.jp/ogi-bin/tran_wcb_ogi_ejje?atw_u=http://www4.ipdl.inpit.go.jp.___2010/03/03

JP.2001-163918,A [CLAIMS]

[Formula 2] (C, R¹, R³, R¹)
$$-P-N$$
 (R¹) $-R³-X$ ···(2)

[Each of X, P and R^1 – R^5 is the sams as that of the contents of the agraement in a general formula Claim 3]A vinyl system polymer which has a functional group at the end expressed with a following (1) among a formula, and (C, R¹, R², R³) mean having joined together in the polymer component or copolymer component expressed with P, and a carbon atom.] general formula (3).

Formula 3]
$$(C, R^1, R^2, R^3) = [P-N (R^4)-R^5-X]_Z \cdot \cdot \cdot \cdot (3)$$

CHR¹⁰-(R-Ar-R)-CHR¹¹ (Ar smong a formula) An aromatic ring and R which have an aromatic ring or that joined together in at least one and a carbon atom among the polymer components or copolymer general formula (1) according to claim 1, (C, R¹, R², R³) CHR¹9...Ar...CHR¹¹, CHR¹9...(Ar-R)-CHR¹¹ or Each of X, P and R^1-R^5 is the same as that of the contents of the agreement in a general formula components which are expressed with Z P, and either a carbon atom, R¹, R² and R³ have combined one or more substituents express an aliphatio group, and R¹⁰ and R¹¹ express an alkyl group or an (1) among a formula, and Z, Are an integer of 3-6 and (O, R¹, R², R³)-[P-N(R⁴)-R⁵-X] _Z, It means sryl group of straight chain ahape of the carbon numbers 1-20, or branching respectively. A vinyl Claim 4In a vinyl system polymer which has a functional group at the end expressed with the system polymer which has a functional group at the end according to claim 1 with which it is the remaining P.]

substituents express an alkyl group or an aryl group of straight chain shape of the carbon numbers 1-20, or branching. A vinyl system polymer which has a functional group at the end according to claim 2 one or more substituents, and Z, an integer of 3-6, R 10, R 11, ..., R 10+x-2, and R 10+x-1 express an alkyl group or an aryl group of straight chain shape of the carbon numbers 1–20, or branching reapectively among a formula. A vinyl system polymer which has a functional group at the end according to oldim CHR¹⁰⁺²⁻¹), - (Ar-R)- (-CHR¹⁰) (-CHR¹¹) ... (-CHR¹⁰⁺²⁻²) (-CHR¹⁰⁺²⁻¹) or -(R-Ar-R)- (-CHR¹⁰) (-[Claim 7] That acrylic ester (meta) of a copolymer is independent or an independent or vinyl system general formula (2) according to claim 2, (C, R¹, R², R³) — Ar-CHR¹⁰, (Ar-R)-CHR¹⁰, or (R-Ar-R)-CHR¹⁰ (Ar among a formula) An aromatic ring and R¹⁰ which have an aromatic ring or one or more general formula (3) according to claim 3, (C, R^1 , R^2 , R^3) -Ar ($-CHR^{10}$) ($-CHR^{11}$) ... ($-CHR^{10+z-2}$) (-CHR11) ... (-CHR^{10+z-2}) (-CHR^{10+z-1}) [As for an aromatic ring in which Ar has an aromatic ring or Claim 5]In a vinyl system polymer which has a functional group at the end expressed with the Claim 6]In a vinyl system polymer which has a functional group at the end expressed with the with which it is expressed.

[Glaim 9]A vinyl system polymer which has a functional group at claims 1–7 whose number average functional group at the end which is a copolymer shown by P in a general formula which expresses [Claim 8] That acrylonitrile (meta) of a copolymer is independent or an independent or vinyl system functional group at the end which is a copolymer shown by P in a general formula which expresses molecular weights are 500-50000, and whose end functional group introduction rates are not less polymer of a vinyl system monomer in which a radical polymerization is possible which has a polymer of a vinyl system monomer in which a radical polymerization is possible which has a with claims 1-5 or an end given in 6 a vinyl system polymer which has a functional group. with claims 1-5 or an end given in 8 a vinyl system polymer which has a functional group. than 90%, or the end given in 8.

olaims 1–8 or the end given in 9, A vinyl system monomer is polymerized and ranked second, using an iodine content compound which contains in intramolecular at least one iodine stoms combined with a earbon atom of a side chain of an aromatic ring as a chain transfer agant, It is general formula NH Claim 10]It is a manufacturing method of a vinyl system polymer which has a functional group at

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(R4)-R5-X (X, R4, and R5 among a formula) to an obtained polymer. All are the same as that of the contents of the agreement in a general formula (1). A manufacturing method of a vinyl system

polymer which has a functional group at the end making an amine compound expressed react and introducing a functional group into a molecular terminal.

Olaim 11]A herdenability constituent which becomes considering a vinyl system polymer which has a functional group at claims 1-8 or the end given in 9 as the main ingredients. Claim 12]A hardenability constituent containing a compound which contains a functional group of a viny) system polymer which has a functional group at olaims 1–8 or the end given in 9, and the above—mentioned end, and a functional group in which a reaction is possible in [two or more] a

12 in which a compound which contains a functional group in which this and a reaction are possible in claims 1-8 or the end given in 9 is a hydroxyl group, The hardenability constituent according to claim Claim 13]A functional group of an end of a vinyl system polymer which has a functional group at two or more] a molecule contains at least one sort of compounds chosen from a group of a

polyfunctional isocyanate compound, melamine resin, and urea resin.

12 in which a compound which contains a functional group in which this and a reaction are possible in I two or more J a molecule contains at least one sort of compounds chosen from a group of a Claim 14]A functional group of an end of a vinyl system polymer which has a functional group at claims 1–8 or the end given in 9 is a carboxyl group, The hardenability constituent according to claim oslyfunctional isocyanate compound, a polyfunctional epoxy compound, and a polyfunctional aziridine

olaims 1-8 or the end given in 9 is a silyl group, The hardenability constituent according to claim 12 in which a compound which contains a functional group in which this and a reaction are possible in [two and a vinyl system monomer which contains at least one polymerization nature unsaturation group in or more] a molecule contains at least one sort of compounds chosen from a group of a multivalent ydrosifyl compound, a multivalent hydrogen silicone compound, a multivalent alkoxysilyl compound, Claim 16]A hardenability constituent which a functional group of an end of a vinyl system polymer which has a functional group at claims 1-8 or the end given in 9 is a vinyl group, and contains this Claim 15]A functional group of an end of a vinyl system polymer which has a functional group at

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DETAILED DESCRIPTION

Detailed Description of the Invention]

Field of the Invention]This invention relates to the hardenability constituent containing the vinyl system polymer which has a functional group at the vinyl system polymer which has a functional group at the end, its manufacturing method, and said end.

ndependent [the polymer which has a functional group at the end], or suitable, and giving the Description of the Prior ArtJA bridge is constructed by using combining a hardening agent nardened material which was excellent in heat resistance, a water resisting proparty, other

.0003]Since the chain extension not only by reticulated-izing by bridge construction but bridge andurance, etc. is known.

shape polymer, it can control that crosslinking density becomes superflucus and resin of outstanding construction of ends happens efficiently as compared with the polymer which has a functional group the amount object of polymers by which chain extension was carried out to straight chain shape can be formed, and resin excellent in clongation or tensile strength is obtained. Formation of the network nside a molecule when it has a functional group in the both ends of the above-mentioned polymer, structure by chain extension takes place easily by having a functional group at the end also in ster physical properties is obtained. About the polymer which has a functional group in one end, by the unction as the resin modifier using the functional group of the end, or a surface-active agent, and different coupling of the resin of a presentation, the so-called block polymer of an AB type can be polymerization methods is made by the present, and according to living anionic polymerization Tha compounded, and the practical use as a resin modifier and a compatibilizer is expected similarly. [0004]About the rubber system polymer which has a functional group at the end, composition (Society of Rubber Industry, Japan.) of the telechello polybutadiene composition by many living

composition (JP,3-287613,A) of polychloroprane etc. which have a hydroxyl group in the both ends by naterial of urethane application or a sealing material, and a modifier of epoxy adhesive. Polyethylene teraphthalate and polyester resin like polycaprolactone are also used abundantly at the use of the [0005]Polymer of a both-ends hydroxyl group like a polypropylene glycol is also used as the raw the iniferter method are reported in the 48th volume, No. 5, the 263rd page, and 1975. same kind etc.

polymer effective in an end which has a functional group using the high radical polymerization method of flowbility is in the actual condition which is not yet put in practical use.
Ologodyke a polymer which introduced the functioning group into the end for example to JP,52564154. The synthesizing method of the saryle polymer which has an alkenyl group in both ends [0006]However, especially (meta) about polar high vinyl system monomers other than the above containing acrylic ester and acrylonitrile (meta), the manufacturing method with a vinyl system

[0008]However, in the method indicated by JP,5–255415,A. In the method which was not easy for introducing a functional group into both ends certainly, and was indicated by JP,5–262808,A. In order polymer which has a hydroxyl group in both ends at JP,5-262808.A using the disulfide which has a a introduce a hydroxyl group into an and certainly, a lot of chain transfer agents must be used, it hydroxyl group is compounded, further, the hydroxyl group of an end is used and the synthesizing (meta) is indicated using alkenyl group content disulfide as a chain transfer agent. The acrylic method of the scrylic polymer which has an alkenyl group at the and (meta) is indicated.

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JP,2001-163918,A [DETAILED DESCRIPTION]

eaves a manufacturing process top problem, and the manufacturing method with effective all cannot

[0009]In recent years, research of living polymerization methods, such as living ionio polymerization and living radical polymerization, is done briskly. Control of a molecular weight and molecular weight manufacture of the polymer which has a functional group at the end oan perform it comparatively synthetic method of the acrylic acid macro monomer which has a functional group at the end by nionic polymerization (meta) is indicated by the Patent Publication Heisei No. 501883 [four to.] easily by changing the active group of a living end into arbitrary substituents. For example, the distribution is possible for the polymer obtained by these living polymerization methods, and

neither an antiposic requirement nor a low temperature service as indicated by the above-mentioned 0010]However, in order that in the case of anionic polymerization control of a termination reaction gazette, it becomes difficult to change the active group of an end into arbitrary substituents, and it or a chain transfer reaction cannot be performed and a reaction may not progress in living, if it is has the problem of being what lacks in practicality.

organic sufforth halide compound as the initiator, and made the matel complex the catalyst (mota) is indicated by JP.9-272714.A. However, when a metal complex is made into a catalyst like the method ndicated by the abova-mentioned gazatte, washing of the metal in the refining processes of reein is manufacturing method of the acrylic polymer which has an alkenyl group at the and which used the predominance attracts attention to reaction controllability from viewpoints of the looseness of the reaction condition of what is a little inferior, the simple nature of operation, etc. For example, the 0011]On the other hand, in living radical polymerization, compared with ionic polymerization, the difficult, and is not practical.

fact, and is ****, the purpose by making into block polymer of an AB type the resin of a presentation resisting property, and is different by coupling. An adhesive, a sealing agent, elastic adhesives, a paint foam, a film, thermoplastic elastomer, it is providing the hardenability constituent containing the vinyl group at the end with which extensive uses, such as a sound deadener various molding materials, and Problem(s) to be Solved by the Invention]This invention was made in view of the above-mentioned which is given with sufficient balance of physical properties boiled and depended, such as elongation system polymer which has a functional group at the vinyl system polymer which has a functional and tensile strength, and endurance by reticulated-izing, such as heat resistance and a water a resin modifier, can be presented, its manufacturing method, and said end.

[Means for Solving the Problem]A vinyl system polymer which has a functional group at the and of the invention according to claim 1 is expressed with a following general formula (1),

Formula 4

X-R5-N (R4)-P- (C, R1, R2, R1)-P-N (R4)-R5-X

[0015][X express the basis of either a hydroxyl group, -NR²R², a carboxyl group, a sihl group, a vinyl group, an alkenyl group or an ally group among a formula, and P, Express independent or the expressed with P, it joins together, Mean that P of another side has combined with either the abovegroup of the carbon numbers 2-20, the alkynyl group of the carbon numbers 2-20. A oxilaryl group, a glycidyl group, an allyl group, an aryl group, a -Ar-mold, -(Ar-R)-mold aromatto ring, or -(R-Ar-R)copolymer of the viryl system monomer in which a radical polymerization is possible, and (C, R^1 , R^2 , R³), In one side and the carbon atom of a polymer component or a copolymer component which are mentioned carbon atom or R1, R2 and R3, and R1, R2, and R3, Respectively Hydrogen, halogen, the alkyl group of the carbon numbers 1-20, the cyclosikyl group of the carbon numbers 3-8, C(=Y) NR⁶R⁷, C(=Y) R⁸, a carboxylic acid chloride group, A hydroxyl group, a cyano radical, the alkenyl mold aromatic ring. (However, the aromatic ring in which Ar has an aromatic ring or one or more http://www4.jpdl.inpit.go.jp/ogi-bin/tran.web.ogi.ejje?atw_u=http%3A%2F%2Fwww4.jpdl... 2010/03/03

ARARICENEUR and Recovers an adjust pergonal, a reference by group, an anterdedly group, an ARARICENEUR group, in the developely group, an anterded you group of the carbon numbers 1-4 which tentil all replaced by the manner of the hydrogen and, And although either the side group of the carbon numbers 1-4 angleded by 1 to three bases cheen from the group of the although group of the authorn numbers 1-4, an any group, a heterosopoly group, GCP) NFR², and CCP3 R², an OCIDAMRUI group and a proper group of the authorn numbers 1-4, an any group, a heterosopoly group, GCP3 NFR², and CCP3 R², an OCIDAMRUI group group as proprieted by the supplication and a shad group of the authorn numbers 1-4, an any group, a shadogen, an a skid group of the carbon numbers 1-4, an allering group of the

actions makes 1-4, an vari group a phony group, activate and RF, Effert or of the alolg womes of the action numbers 1-20 containing not or more palar groups or aromatic integration that where the desear from the action of a first experiment of a make group or aromatic integration that where 1-20 containing not or more palar groups or aromatic integration that where the desear from the action of a make a market or a containing or the bearses first into an high group of the eachern numbers 1-20 may find proup of the carbon numbers 1-20 may form of the carbon numbers 1-20 may of the carbon numbers 1-20 may only the carbon numbers 1-20 may are proper the carbon numbers 1-20 may are proper than the carbon numbers 1-20 may only the carbon numbers 1-20 may are proper than the carbon numbers 1-20 may be allowed the carbon numbers 1-20 may are proper than the carbon numbers 1-20 may are not of the invention according to

100.0] Each of X P and $R^1 - R^2$ is the same as that of the contents of the agreement in general formule of Lamong a formular and (Q, R^1, R^2) Frame having pinion together in the polymer component or copolymer component a copressed with P, and α entroin atom. It is a polymer (1002) The very system polymer which has a functional group at the end of the invention according to elim S a sepressed of with a following general formule (S).

Formula 6]
$$(C,R^1,R^1,R^2)=(P-N(R^3)-R^3-X]_{-1}\cdots (3)$$

 $[DQZ][Exb_A of X_P to dR^1 - P^2]$ is the same as the of the contrate of the agreement in a general infeation (1) more green a formula of the agreement in a general and the same of the

to you go fatigited thain shape of the carbon numbers 1–30, or brondhiptic respectively. It is spreased.

For the properties of the proper

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express an alkyl group or an aryl group of straight chain ahape of the carbon numbers 1-20, or

JP,2001-163918,A [DETAILED DESCRIPTION]

branching. It is expressed.

Solidary with spatial proposed and a sincination groun at the send of the invention ascending to claim & in a widely superan polymer which has a functional groun at the send of the member and superassed with the general 1, LA-TB-L-CBH ²D-L-CBH ²D-L-

[0008]A viryl system polymer which has a functional group at the end of the invention according to claim. It is a general functional which expresses with claims 1.6 or and edylent is a viryle system polymer which has a functional group, it is that sonly caster (metal) of a copolymer is independent or what of a viryll system opportunity with of a viryll system commonter which is shown by P and in which a radical polymerization is possible.

is independent or that is a copolymer.

[002734 with system polymer which has a functional group at the end of the invention according to claim 8, in a general formula which expresses with claims 1-fo or en end given in 8 a virily system topolymer which has a functional group, it is that anythoritie (meta) of a copolymer is independent or

what of a voly system mononer which is shown by P and in which a nadical polymerization is possible is andeaswhere or that it is coolcifirmed to a coolcifirmed which has a finational group at the football a vinyl system polymer which has a finational group at the and of the monoting coolcified to the a finational group it alims 1.0. or the end of an investigation is given in a functional group and and a very possible are 300-5000, and an end functional group in page 1.0.

(0023) manufacturing related of a viryly system polymer which has a functional group at the end of the inventional group at the end of the invention secondary to clean (10.1 in a manufacturin which of a vivil yestem polymer which has a functional group to clean 10.1 in a manufacturin which of a vivil yestem polymer which has a functional group as clean 1-6 or the ord pivon in 9.1 is general formula MHIGP-p2-V. On a polymer which polymerized and was produced by realing so cond in a vivil sistem moment, saling an lotting which combine in functionication at a vivil sistem moment, saling an lotting and on a secondary condition as a valial transfer agent (Each of X. K.) and P4 is the same after of the agreement of the agreement in a general formula.) In many a formula, An mine compound agreement of the agreement in a general formula (1) manufact formula. An interession of the interest of the agreement of the agreement in a general formula (1) manufact formula.)

terminal.

The control manufacture on the second of the invention according to claim 11 becomes considering a virtyl spoke, hardenskilly contribuent of the invention group at claims 1–6 or the and given in 9 as the main second contribuent which has a functional group at claims 1–6 or the and given in 9 as the main

Improvement that the constituent of the invention according to claim 12 contains a compound which contains a functional group of a vivyl system polymer which has a functional group at claims 1-8 or the end given in 8, and the abover-mentioned end, and a functional group in which a reaction is possible in Ewo or move 1 a melecula.

[0072]A functional group of an end of a why section polymer, in which thereforeality constitutions of the restriction are an end of a why section by the section and a section and a section and a section as a functional group at claims 1—6 or the end given in 0 is a headron group at claims 1—6 or the end given in 0 is a headron group at claims 1—6 or the end given in 0 is a headron group at claims 1—6 or the end given in 0 is a headron group at claims 1—6 or the end given in 0 is a headron group at claims 1—6 or the end given in 0 is a functional group at claims 1—6 or the end given in 0 is a functional group at claims 1—6 or the end given in 0 is a headron given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given in 0 is a functional given by 1—6 or the end given by 1

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azante componue.

(1034) A functional group of an end of a vinyl system polymar in which a hardemability constituent of
the invention according to claim 15 has a functional group at claims 1-8 or the end given in 9 is a
alignous, A compound which contains a functional group in which this and a reaction are possible in
the or more 1 a melecule contains at least one and of diornounds obsess from a group of a

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nuitivalent hydrosilyl compound, a multivalent hydrogen silicone compound, a multivalent alkoxyailyl

[0035]A functional group of an and of a vinyl system polymer which has a functional group at claims I-8 or the end given in 9 is a vinyl group, and a herdenability constituent of the invention according to claim 16 contains this and a vinyl system monomer which contains at least one polymerization

epoxy group, an ethynyl group, a sulfhydryl group, en oxazoline group, a maleimide group, an azlactone group, etc. are mentioned, for example. Especially, a hydroxyl group, a carboxyl group, a silyl group, nature unsaturetion group in intramolecular. [0036]An end functional group of a vinyl system polymer which has a functional group at the end of his invention, Especially if it does not separate temporally, it is not limited, but a hydroxyl group, a sarboxyl group, a silyl group, an alkenyl group, a halogen group, an amino group, a thionyl group, an

to amide group. When an end functional group of a vinyl system polymer which has a functional group coample, when using acrylic seter (meta) as the main ingradients, chain extension or a handened material made refloatated of a vinyl system polymer which has a functional group at the end obtained is excelled in turnspersor, and excellent in weathersality, hear traistance, and a water resisting roposety, and excellent in an affestive property. The abover-manifored performance occurs when used combining other vinyl system monomers, if a rate of acrylic ester (meta) is 50 % of the weight or more, an improvement effect of each above-mentioned performance will be eccepted, and if it is socyanate compound react, and the reactivity becomes high as compared with a case where there is sorylic soid (meta) benzyl, sorylic soid (meta) steeryl, (Meta) Acrylic soid 2-hydroxyethyl, KDSHIRU, sorylic soid (meta) 3-methoxy propyl. Acrylic soid (meta) fluoro alkyl ester, scrylamide (meta), sorylic 0037]Especially as the above-mentioned silyl group, although not limited, for example A tribydro silyl fluorine atom ere mentioned. [of the carbon numbers 1–20] Two or more sorts may be put together goup, en ethyl dimethoxy silyl group, a diethyl methoxy silyl group, A triethoxy silyl group, a methyldi and of end functional group, the reactivity of end functional groups, and an end functional group and containing a vinyl system polymer which has alkoxy silyl groups in this end is excellent in workability. oonsidered as 100% of acryllo ester (meta), each above-mentioned performence will improve notably. [0040]Especially as the above-mentioned (meta) acrylic ester, elthough not limited, For example, characterized by having an amide group near the end of a molecule. For thia reason, depending on a methyl acrylate (meta), ethyl acrylate (meta), acrylic acid (meta) n-propyl, (Meta) Acrylic acid isopropyl, acrylic acid (meta) r-butyl, (Meta) Isobutyl acrylate, acrylic acid (meta) tert-butyl, (Meta) 20041 When changing to the above-mentioned (meta) acrylic ester and using acrylonitrile (meta) as group, A methyldi hydrosilyl group, a dimethyl hydrosilyl group, an ethyl dihydrosilyl group, A diethyl at the end of this invention is elkoxy sliyl groups, the reactivity of alkoxy sliyl groups is improved because an amide group is near alkoxy sliyl groups. Since time which herdening takes is shortened. s compound in which a resction is possible is improved. For example, an end functional group of a rinyl aystem polymer which has a functional group at the end of this invention is a hydroxyl group, Aorylic acid pentyl, acrylic acid (meta) n-hexyl, acrylic acid (meta) isohexyl, (Meta) Acrylic acid n-Especially when R4 is a hydrogen atom, a vinyl system polymer obtained serves as structure with ydrosilyl group, a trimethoxysilyl group, a methyl dimethoxy silyl group. A dimethyl methoxy silyl thoxy silyl group, a dimethylethoxy silyl group, an ethyldiethoxy silyl group, a diethylethoxy silyl and it acts as a catalyst because an amide group is neer a hydroxyl group in making this and an octyl, acrylic acid (meta) isooctyl, (Meta) 2-ethylhexyl acrylate, acrylic acid (meta) nonyl, (Meta) Decyl acrylate, acrylic acid (meta) dodecyl, acrylic acid (meta) phenyl, (Meta) Acrylic acid toluyl, acid (meta), etc. by which some or all of an alkyl group of a hydrogen etcm was replaced with a the main ingredients, chain extension or a hardened material made reticulated of a vinyl system ntensity of a hardened material is revealed at an early stage, and a hardenability constituent 0039]Although a vinyl system monomer in perticular used by this invention is not limited, For and these (meta) sorylic ester may be used together, although it may be used independently. polymer which has a functional group at the and obtained becomes the thing excellent in oil goup, the Tori (isopropoxy) silvi group, the Tori (in-butoxy) silvi group, etc. are mentioned 0038]A vinyl system polymer which has a functional group at the end of this invantion is secondary amine near en end, and a herdening reaction becomes is easy to be promoted. and an alkenyl group are used suitably.

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esistance and gas barrier property. The above-mentioned performance occurs, when used combining

improvement effect of each above-mentioned performance will be accepted, and if it is considered as other vinyl system monomers, if a rate of aorylonitrile (meta) is 50 % of the weight or more, an acrylonitrile (meta) 100%, each ebove-mantioned performance will improve notably.

ring, and a biphenyl ring, or one or more substituents, and R means a -Ar-R-mold or a -R-Ar-R-mold arometic ring (however, Ar expresses an aromatic group and R expresses an aliphatic group), Ar is an 0043]They are [in / in a general formula which expresses with en end of the invention according to prometic ring which has aromatic rings, such as the benzene ring, a naphthalene ring, an andhracene 0042]in general formula (1) - (3) which expresses with an end of the invention according to claim 1 to 3 a vinyl system polymer which has a functional group, (C, R¹, R², R³) Among an ingredient and among R1, R2, and R3, although either can take a -Ar-mold, a -Ar-R-mold, or a -R-Ar-R-mold aromatic ring equivalent to an analkyl group.

ingredient, hydrogen, halogen, end an alkyl group of the carbon numbers 1-20 — desirable — 1-10 to 6 e vinyl system polymer which has a functional group, (C, R¹, R², R³) As R¹. R², and R³, among an NR²R⁷, C(=Y) R³, a carboxylio ecid chloride group, a hydroxyl group, a cyano radical, an alkenyl group claim 4 to 6 a vinyl system polymer which has a functional group / a –Ar-mold, a –Ar-R-mold, or a – R-Ar-R-mold eromatic ring / general formula (1) – (3)] the same contents. [0044]in general formula (1) – (3) which expresses with an end of the invention according to claim 1 more — desirable — an alkyl group of 1-6. A cycloalkyl group of the carbon numbers 3-8, C(=Y)

heterocyclyl group, C(=Y) NR⁶R⁷, Although an alkyl group, an OKIRANIRU group, or e glycidyl group of ARARUKENIRU group, en alkyl group of the carbon numbers 1-6 which until all replaced by a halogen the carbon numbers 1-6 replaced by 1 to three bases chosen from a group of C(=Y) R⁶ is mentioned, phenyl group, or benzyl -- R⁵. In an alkyl group (preferably 1-10, more preferably alkyl group of 1-6) atom from one of a hydrogen atom and an alkoxy group of the carbon numbers 1-4, an aryl group, a it is two or less pieces that both R¹, R², and R² cen take hydrogen. R⁴ expresses hydrogen, an alkyl of the carbon numbers 2-20, and an alkynyl group of the carbon numbers 2-20 — desirable — an alkenyl group of 2–6, or an alkynyl group. More preferebly A vinyl group, e oxilenyl group, a gfycidyl substituents. A heterocyclyl group with which R expresses an eliphatic group, an aralkyl group, an group, an allyl group, An aryl group, a "Ar-mold, -(Ar-R)-mold aromatic ring or -(R-Ar-R)-mold group of the carbon numbers 1-6, an elkenyl group of the cerbon numbers 1-6, an aryl group, a aromatic ring, however, an eromatic ring in which Ar has an aromatic ring or one or more

of the carbon numbers 1-20, its main ohain, or a side ohain, an ester group, Either of the alkyl groups cycloslkyl group of the carbon numbers 1-5 which both R⁶ end R⁷ combined with a nitrogen atom, Or Re and R7 join together, and an alkylene group of the cerbon numbers 2-5 is formed, A thing in which (preferably 1-10, more preferably alkyl group of 1-6) of the carbon numbers 1-20 containing one or expressed. Y is NR⁹ or an oxygen atom, and NR⁹R⁷, An alkyl group of the oarbon numbers 1-5 or a an annular group of 3 which forms a nitrogen atom and an annular group of 3 - 6 member, or has a expresses en alkyl group or an aryl group of hydrogen, a streight chein, or the carbon numbers 1-20 side chain – 6 members was formed is expressed, R⁸ is en alkyl group of the carbon numbers 1–20. an alkoxy group of the carbon numbers 1–20, en eryloxy group, or a heterocyclyl oxy group, and R^9 group, an amino group, a urethane group, a sulfhydryl group, a vinyl group, and the benzene ring is nore polar groups or aromatic rings which were chosen from a group which consists of an amide

helogenide (suitably fluoride or a chloride) (more suitably methyl [Suitably the carbon numbers 1-6]). numbers 1-6] **. Alkylthio of the carbon numbers 1-6, cycloslkyl of the carbon numbers 3-8, phenyl PISENIRU, Sey pilus RENIRU (suitably phenyl and naphthyl), and hare each hydrogen atom And alkyl of the carbon numbers 1-20 (more suitably methyl [Suitably the carbon numbers 1-6 D, Alkyl of the TORIFENIRENIRU, fluoran themyl, premyl, Penta SENIRU, KURISENIRU, NAFTA SENIRU, hexaphenyl, .0045]As the above-mentioned anyl group, phemyl, naphthyl, phenan tolyl, phenalenyl, Anthracenyl. It may be replaced by phenyl replaced by an alkyl group of halogen, NH2, alkylamino of the carbon numbers 1-6, dialkylamino of the carbon numbers 1-6 and 1-5 halogen atoms, and/or the carbon Alkenyl of the carbon numbars 1-20, alkynyl of the carbon numbers 1-20, alkoxy [of the carbon oarbon numbers 1-20 by which each of a hydrogen atom was independently replaced with e

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of the carbon numbers 1-8, and 1-3 autostituents chosen from a group which consists of alkoxy **** when yor is the carbon numbers 1-4 is and "And "bays pheny! Ush" and methosynthery mast suitably, 100481s Ar in the above-mentioned -Ar-mold. "Ar-19 mold arounds orig. or "RFA-PA-PA-mold ary!" --- phenyl. Phenyl replaced by phenyl replaced with naphthyl, fluorida, or 1-5 chlorine and alkyl 1-5 phenyl may be replaced by ona of the above-mentioned substituents, and 1-7 naphthyla are replaced — **** (when an aryl group is replaced suitably, 1-3 pieces are replaced.) — suitable —

aromatic ring. It is an aromatic ring which has aromatic rings, such as the benzene ring, a naphthalene ing, an anthracene ring, and a biphenyl ring, or one or more substituents, and a "Ar-R"mold or a -R" Ar-R-mold aromatic ring equivalent to an aralkyl group is meant as R.

Those known hydrogenation gestalten are said to FENAJINIRU, phenoxazinyl, phenothiazinyl, oxazolyl. thiazolyl, isoxazolyl, isothiazolyl, and a specialist in the art concerned. Pyridyl, a furil, prolyl, thienyl, imidazolyl, pyrazolyl, pyrazinyl one, pyrimidinyl, pyridazinyl, pyranyl, and indolyl are included by suitable [0047]As the above-montioned hoterocyclyl group, pyridyl, a furil, pyrolyl, thienyl, Imidazolyl, pyrazolyl, pyrazolyl, pyrazolyl, pyridazinyl pyridazinyl, pyridazinyl, pyridazinyl, indelyl, indazolyl, a benzo furil. An sobenzo furil, benzo thienyl, isobenzo thienyl, olo MENIRU, KISAN thenyl, Puri Nils, PUTERLINIRU, "ENOKISACHI inyl, Carbazoyl, SHINORINIRU, phenanthridinyl, acridinyl, 1, 10-phenan trolley nil, quinolyl, isoquinolyl, Phthalazinyl, chinae-cortex ZORINIRU, kino SARINIRU, nephthyridinyl,

group expresses a vinyl group which may be replaced with an alkyl group and/or a halogan atom of [0048] Expressing an alkanyl group by which aryl group subattution was carried out as the above-martioned ARARUKENIRU group, an aryl group is as having mentioned above here, and an alkenyl neterocyclyl group, and the most suitable heterocyclyl group is pyridyl. the carbon numbers 1-6 of one piece or two pieces.

0049]When a carbon number of an alkyl group of the above-mentioned carbon numbers 1-20, an alkoxy group of the carbon numbers 1-20 becomes larger than 20, an end of this invention has a alkenyl group of the carbon numbers 2-20, an alkynyl group of the carbon numbers 2-20, and an

oossibility that the adhesive property of a hardenability constituent containing a vinyl system polymer which has a functional group may worsen.

hilling, ours time becoming long or reducing hardened meterial physicial properties since hardening is not tridly performed, will be oaused if it is not predefall and in our much large, a tuniber average moistodar wildight—desirable—500-100,000—it is 500-50,000 still more preferably. group introduction rate of a viry) ayatem polymer which has a functional group at the end of this invantion has a possibility of reducing hardened material physical properties whan it is not much low. 0050]A molecular weight of a vinyl system polymer which has a functional group at the end of this nardenability constituent containing the above-mentioned polymer.] hardening agents are needed, [0051]Although not limited, since hardening is not fully performed and aspecially an end functional Since the productivity of a hardened material and deterioration of quality, such as hardenability nvention, A lot of [although not limited in particular / if not much small, in order to stiffen a

functional group is mentioned to an end which introduces a functional group into a molecular terminal agent, it is general formula NH(R*)-R5-X (X, R4, and R5 among a formula) to an obtained polymer. All [0052]A manufacturing method of a vinyl system polymer which has a functional group at the end of are the same as that of the contents of the agreement in a general formula (1). An amine compound expressed is made to react and a manufacturing method of a vinyl system polymer which has a this invention, Although not limited in particular, preferably, A vinyl system monomer is polymerized and ranked second, using an iodine content compound which cortains in intramolecular at least one odine atoms combined with a carbon atom of a side chain of an aromatic ring as a chain transfer

t is not less than 90% prefarably.

with a carbon atom in these aromatic rings, and at least one or more iodine atoms are combined with bova. Atthough an alkyl group, an alkoxy group, an amino group, a hydroxyl group, a halogen group, a 0053]An aromatic ring which constitutes the above-mentioned iodine content compound, Although long as it does not check a radical polymarization reaction, it may have substituents other than the them via a carbon atom of this substituent, for example. In the abova-mantioned aromatic ring, as anthracene ring, were mentioned, it had one or more substituents combined with an aromatic ring not limited in particular, aromatic rings, such as the benzene ring, a naphthalene ring, and an

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sarbonyl group, a carboxyl group. a thionyl group, etc. are mentioned and these may exist by a singla disacciation of a carbon-halogen bond, since an electron donativa group which becomes the carbon notably, and generated becomes high, and it becomes easy to control it of a request polymerization Jonative group consists of aromatic rings etc. as mentioned above, the chain transfer nature of a 0054]It is made easy for binding energy of a carbon-halogen bond to fall and to happen in radical carbon radical which a radical stabilization effect by a pi electron of an aromatic ring showed up compound which indine atoms combined with the above-mantioned structure. Since an electron stom which iodine atoms combined from an aromatic ring etc. has combined an iodine content species as these substituants, for axampla, two or mora sorts may axist.

vinyl system polymer which has a functional group at the end obtained serves as structure expressed with a said general formula (1) type following general formula (4). 0055]As a chain transfer agent of the above-mentioned structure, it is general formula ICHR¹⁰–Ar- $\mathrm{CHR}^{10}L$ [Ar and R^{10} express a basis of said general formula (1) and the contents. When using], a

K-R*-N (R')-P-CHR'4-Ar-CHR'4-P-N (R')-R'-X

[0057]As a chain transfer agent, it is general formula Ar-OHR 10 . [Ar and \mathbb{R}^{10} express the basis of said general formula (1) and the contents. When using], the vinyl system polymer which has a functional group at the end obtained serves as atructure expressed with a said general formula (2) type following general formula (5).

[Formula 8] A r - CHR 1 - P - N (R 1) - R 5 - X · · · (5)

[0059]]t is the general formula Ar (-CHR¹⁰I) (-CHR¹¹I) as a chain transfer agent... (-CHR^{10+Z-2}I) (-When using], the vinyl system polymer which has a functional group at the end obtained serves as structure expressed with a said general formula (3) typo following general formula (6). CHR $^{10+2-1}$ [Ar. R^{10} and Z express the basis of said general formula (1) – (3) and the contents.

Ar (-CHR11) (-CHR11) . . . (-CHR10+2-1) (-CHR11+2-1

(P-N (R')-R'-X], ...(3)

biphenyl, a screw (4-iodo methylphenyl), 2,8-bis(iodomethyl)naphthalene, 2,4,6,8-tetrakis (iodomethyl) (iodomethyl) anthracene, etc. are mentioned, and the compound which contains two lodine atoms in a substituent described above, are not limited, but. For example, 1,3-bis(iodomethyl)benzene, 1,4-bis iodomethyl)benzene, 1,3,5-tris(iodomethyl) benzene, diphenyl diiodomethane, 4,4'-bis(iodomethyl) [0062]It may have substituents other than the above if needed in a carbon atom of a substituent compounds which have combined at least one or more iodine stoms via the carbon atom of the [0061]The iodine content compound used as a chain transfer agent, Especially if it is aromatic naphthalene, 2,6-bis(iodomethy))anthracene, 9,10-bis(iodomethy))anthracene, 2,4,5,8-tetrakis molecule especially is used suitably.

which combined with the above-mentioned aromatic ring and has combined iodine atoms. Although an alkyl group, an alkoxy group, an amino group, a hydroxyl group, a halogen group, a carbonyl group. a oarboxyl group, a thionyl group, etc. are mentioned and these may exist by one sort as these substituents, for example, two sorts may exist. [0063]In an aromatic ring of these iodine content compounds, as long as it does not check a radical

iodine atoms if naedad. Although an alkyl group, an alkoxy group, an amino group, a hydroxyl group, a halogen group, a carbonyl group, a carboxyl group, a thionyl group, atc. are mentioned and these may axist by a single apacias as these substituents, for example, two or mora sorts may exist. polymerization reaction, it may have a substituent which has not combined the above-mentioned

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(2065)The above-mentioned radical polymerization initiator by operation of en exposure of active light, such as radiation, visible light, ultraviolet reys, and laser beams, hesting, or a oxidetion reduction rato, t-butytporoxy neodocanoate, Alpha-cumilporoxy neodecanoate, diacyl peroxide, Organic peroxide, such as peroxy estor, 2,2"-azobisisobutyronitrile, 2,2"-ezobis (2-methylbutyronitrile), 2, and of using means, such as an exposure of active light, such as use of a radical polymerization initiator, 2'-azobis (2,4-dimethylvaloronitrilc). Azo compounds, such as 2.2'-azobisiso butanoic soid dimethyl; '064]In e manufacturing method of s vinyl system polymer which has a functional group at the end of this invention, although a method in particular of a radical polymerization is not limited, a method phemical reaction. Especially if it is a compound which generates a radical, are not limited, but. For peroxide, peroxy ketal, Hydropcroxide, lauroyl peroxide, benzoyl peroxide, t-butyl par OKISHIBIBA potassium persulfate and ammonium persulfate, a benzoyl peroxide dimethylaniline system, and a perium (IV) salt-slookol system, etc. are mentioned. These polymerization initiators are chosen adiation, visible light, ultraviolet rays, and laser beams, and heating, is mentioned, for example. redox initiators, such as the inorganic peroxide; hydrogen peroxide-1st iron systems, such as 0066]In the case of a polymerization reaction by exposure of active light, such as the aboveexample, peroxy carbonate, disopropyl peroxi dicarbonate, Dioctyl peroxi dicarbonate, ketone according to polymerization conditions, such as polymerization temperature, and can be used combining one sort or two sorts or more.

0067]Since control of a polymarization resction will become difficult if it is not limitad especially if it mentioned visible light and ultraviolet rays, it may add combining one sort of a photosensitizer which consists of an azo compound, a peroxide, a carbonyl compound, a sulfur compound, coloring matter, etc. if needed, or two sorts or mors.

above-mentioned radical polymerization initiator used, 0.02-20 mol is 0.05-10 mol more preferably to secome slow if not much small, and conversion falls and it is not much large, the amount of the is the quantity of a grade which makes a radioal polymerization start, but reaction valocity will

[008]the above-mentioned radical polymerization temperature in particular is not limited, and temperature generally used for a radical polymerization is used — a kind of a monomer or radical 0069]A gestalt in particular of the above-mentioned radical polymerization is not limited, and a colymerization gestalt generally used for a radical polymerization can be used for it. As these polymerization initiator -- things -- **** is -30-120 ** preferably.

yclohexanone; Cellosolve Solvent; dimethyfformamides, such as aromatic solvent; methyls cellosolvs, such as benzene, toluane, and xylene, and sthylocllosolve, dimethyl sulfoxida, etc. are mentioned, end sxampla. As a solvent used for the above-mentioned solution polymerization, especially if the abovementioned radioal polymerization is not checked, are not limited, but. For example, ester solvents, such as ethyl acetate, propyl acetate, and butyl acetate; Methyl ethyl ketone. Ketones, such as olymerization, suspension polymerization, and an emulsion polymerization, are mentioned, for oolymerization gestalten, polymerization gestalten, such as mass polymerization, solution can combine and use one sort or two sorts or more.

group into a molecular terminal of this polymer, it is general formula $NH(R^4)-R^5-X$. [Each of X, R^4 , and R⁵ is the same as that of the contents of the agreement in a general formula (1) among a formula. An amine compound expressed with] is used suitably. If an exemple of 23 of the above-mentioned amine oompound is shown, for example Aminoethanol, Ethylenediamine, a glycine, p-aminostyrene, and 3-aminopropyl triethoxysilane are mentioned, and a hydroxyl group, an amino group, a carboxyl group, an 0070]As an amine compound for making it react to an obtained polymer and introducing a functional alkenyl group, and alkoxy silyl groups are introduced into a molecular terminal of the abovenentioned polymer by these, respectively.

[0071]This can be used for a vinyl system polymer which has a functional group at the end obtained mentioned polymer independent as a hardenability ingredient according to a kind of functional group which the above-mentioned polymer has, It can also have composition which contains a compound mentioned polymer have, and a functional group in which a reaction is possible in [two or more] e Although the above-mentioned hardenability constituent can also be constituted from an aboveby invention given in claims 1-8 or 9 as a hardenability constituent which becomes as a subject. which contains a functional group of an end which the above-mantioned polymer and the aboveittp://www4.ipdl.inpit.go.jp/cgi~bin/tran_web_cgi_ejje?atw_u=http%3A%2F%2Fwww4.ipdl.i.. 2010/03/03

nolecule as a hardenability ingredient.

with e functional group (A) of a compound which contains a functional group in which functional group parry out bleeding, and the surface is polluted or an adhesive property is reduced, desirable --- ten to unctional group at the end, and the above-mentioned polymer have, and e functionel group in which e reaction is possible in [two or more] a molecule as a hardenability ingredient. A mixed mole retio X) of a vinyl system polymer and the above-mentioned polymer which has a functional group at the 0072]In the case of composition of that the above-mentioned hardenability constituent contains a obtained will fall, Elongation of a hardened material which will be obtained by hardening progressing compound which contains a functional group of an end which a vinyl system polymer which has a functional group in which the unreacted above X and a reaction are possible in [two or more] a molecule remains into a hardened material in large quantities, and become a cause of foaming, or and, the above X, and a reaction are possible in [two or more] a molecule. If a mole ratio of X too much if a mole ratio of A increases not much falls, or, Since a compound which contains a noreases not much, hardening will not fully be performed but intensity of a hardened material

[0073]Other polymers in which functional group (X) of the above-mentioned polymer has a hydroxyl oopolymer, Polycester polyol, Polyburadiene polyol, hydrogenation polybutadisne polyol, eorylic polyol, polyoarbonate polyol, polyoaprolactone polyol, fluoride polyol, phanol system polyol, polymeric polyol, group at intramoleculars other than the above-mentioned polymer in a hardenability constituent of the invention according to claim 13 which is a hydroxyl group may be blended. As other polymers polytetramethylena glycol, Verious polysther polyol, such ss an ethylene oxide propylene oxide which have a hydroxyl group in the above-mentioned intremolecular, Although not limited in particular, for example A polyethylene giycol, A polypropylane giycol, a polypropylane giycol, 3.1 — more — desirable — five to 0.2 — it is 3-0.5 still more preferably.

0074]The above-mentioned polyfunctional isocyanate compound among compounds which contain a diisocyanate, isophorone diisocyanate, hexamethylene di-isocyanate, 2.2,4-trimethyl hexamethylene reaction are possible in [two or more] a molecule. Although not limited in particular, for example diisocyanete, etc. are mentioned. Two or more sorts may be put together and these may be used di-isocyanate, naphthalene diisocyanate, diphenyl ether diisocyanate, polymeric diphenylmethane trimethylolpropane, Diphenylmethane diisooyanate, hydrogenation diphenylmethane diisooyanate, functional group in which functional group (X) of an end of the above-mentioned polymer and a Tolviene diisocyanate. Hydrogenation tolyiene diisocyanate, a tolyiene diisocyanate addition of friphonylmethane triisooyanate, methylenebis (4-phenylmethane) tri-isocyanate, Xylylene eto, are mentioned.

0075]In order to control a hardening reaction of the above-mentioned polymer and a polyfunctional Although the above-mantioned hardoning reaction in particular is not limitad, 0-300 ** of temporature conditions are more preferably between 25-200 ** and 10 seconds - ten days of cure isooyanate compound, catalysts, such as organic tin and tertiary amine, may be used if needed.

together, although it may be used independently.

0076]in a hardenability constituent of the invention according to claim 14 whose functional group (X) of the above-mentioned polymer is a carboxyl group, Among compounds which contain a functional [0077]Although the above-mentioned polyfunctional epoxy compound in particular is not limited, For are mentioned. Two or more sorts may be put together end these may be used together, although it N.N.N.-tetraglygidyl ether m-xylenediamine, 1,3-bis(N.N-diglygidyl aminomethyl)oyolohexane, etc. group in which functional group (X) of an end of the above-mentioned polymer and a reaction are polyfunctional isocyanate compound indicated for the preceding clause is mentioned, for example. hoxanodiol diglyoidyl ether. Trimethylolpropane triglycidyl ether, diglyoidyl anline, diglycidyl amine, example, bisphenol A, an epichlorohydrin type epoxy resin, Ethylone glycol diglyoidyl ether, 1, 6possible in [two or more] a molecule, although the above-mentioned polyfunctional isocyanate compound is not limited in particular like a hardenability constituent of the preceding clause, a may be used independently.

may be put together and thess may be used togethor, although it may be used independantly. [0079]Atthough a compound in particular that has two or more amino groups in the above-mentioned For example, N.N-hexamethylene 1.6-screw (1-aziridine carboxyamide), trimethylolpropanetri-beta-[0078]Although the above-mentioned polyfunctional aziridine compound in particular is not limited. aziridinyl propionete, and isophthloyl 1- (2-methylaziridine) ato, are mentioned. Two or more sorts

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ntramoleculer ie not limited, ethylenediamine, 1,3-diaminopropane, 1,4-diaminobutane, 1,5diaminopentane, hexamethylenedlamine, etc. ere mentioned, for axample.

0080]In a hardenability constituent of the invention eccording to claim 15 whose functional group (X) compound or a multivalent hydrogan silicone compound emong compounds which contein a functional example. Although it is not the above-mentioned multivalent alkoxysilyl compound, especially a thing group in which functional group (X) of an end of the above-mentioned polymer and a reaction are possible in [two or more] a molecule, Although not limited in particular, either a publicly known 0081]As a silyl group in the above-mentioned multivalent hydrosilyl compound and a multivalent multivalent hydrosily compound or a multivalent hydrogen silicone compound can be used, for of the above-mentioned polymer is e silyl group, The above-mentioned multivalent hydrosilyl limited, all of a publicly known multivalent alkoxysilyl compound can be used, for example,

0082]in a hardenability constituent of the invention according to claim 16 whose functional group (X) group, an ethyldiethoxy silyl group, the Tori (isopropoxy) silyl group, the Tori (n-propoxy) silyl group, of the above-mentioned polymer is a vinyl group, A vinyl system monomer which has at least one polymerization nature unsaturation group in the above-mentioned intramolecular of a compound ori (n-butoxy) silyl group, etc. are mentioned.

ilinydrosilyl group, A trimethoxysilyl group, a methyl dimethoxy silyl group, an ethyl dimethoxy silyl

alkoxysityl compound, For example, a trihydro silyl group, a methyldi hydrosilyl group, an ethyl

polymer end a reaction are possible in [two or more] a molecule. Although not limited in perticular, which conteins a functionel group in which functional group (X) of an end of the above-mentioned monomer which constitutes a polymer or a copolymer expressed with P, and in which e radica or example in a general formule (1) described ebove, a vinyl system monomer eto. which can odymerize by a polymerization method of the same vinyl system monomer as a vinyl system oolymerization is possible, etc. and others are mentioned.

0083]A various application of an adhesive, a sealing agent, elastic adhesives, a paint, foam, a film, hermoplastic elastomer, a sound deadener, various molding materials, a resin modifier, a gel coat gent, artificial marble, etc. is presented with claims 11-15 or a hardenability constituent of an

Embodiment of the Invention] Although the example of this invention is given to below and explained nvention given in 16. 0084

naintained at 60 ** and the polymerization reaction was continued for 5 hours. The conversion of 5 [0085](Example 1) 100 g of butyl acrylate, the 1,4-bis(lodomethyl)benzene 4.0g. After scaling 0.8g of 2.2'-azobisisobutyronitrile, and 100 g of toluene to the 1 liter-capacity 4 Thu mouth separable flask emperature probe, the nitrogen purge of the inside of e polymerization vessel was carried out in subbling. Passing nitrogen gas, it stirred at 100 rpm, the inside of a polymerization vessel was and attaching separable covering, stirring wings, a three-way cock, e condenser tube, and a to it in more detail, this invention is not limited only to these examples.

with methanol, carries out reduced pressure drying at 100 ** further for 5 hours, and has a functional 0086]in order to change the end group of the obtained polymer aftar the end of a polymerization, 3.0 z of 2-aminoethanol is added, After making it react at 100 ** for 20 hours, the vinyl system polymer nentioned end group displacing agent, and the solvent, removes them at 150 **, washes a polymer which carries out distillation under reduced pressure of said unreacted monomer, the abovenours after was 96%.

compound, the polymerization initiator, catalyst, and solvent which are respectively indicated to Table Example 1 on the polymerization conditions, end group displacing agent, and substitution conditions which are indicated to the table was produced using the vinyl system monomer, the iodine content [0087](Examples 2-13) The vinyl system polymer which has a functional group at the end like group at the end was produced.

[0088] [Table 1]

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average molecular weight, molecular weight distribution (ratio of weight average molecular weight to a polymer which has a functional group at the end obtained in above-mentioned Examples 1-13, weight 0089]The functional group number of the number average molecular weight of the vinyl system number average molecular weight), and an end was measured by the method shown below. A measurement result is shown in Table 2.

functional group at tha and obtained in Example 8, 5mM lithium bromida / dimethy/formamide solution [0090]]. A number average molecular weight, weight average molecular weight, and molecular weight was used for the cluent, and the column was changed into the Shows Denko K.K. make, "KD-805", measured using [GPC (column: the Showa Denko K.K. make, "KF-80M" x2 **)], and computed by distribution: gel PAMIESHON column chromatograph which used tetrahydrofuran for eluent it polystyrene reference standard convarsion. Only about the vinyl system polymer which has a

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"KD-802.5", and was measured.

and "KD-902.5", and was measured. [0031]2. The functional group number of an end : it is the bottom in fixed quantity by esterifying with nto one molecule was computed and shown in Table 2 from the number average molecular weight of he number of mols of the hydroxyl group of the end quantified as mentioned above, and the abovesystem polymer which has a functional group at the end obtained in Example 9 is the bottom in fixed the pyridine solution of phthalic anhydride and thrating the superfluous reagent with the methanol solution of sodium hydroxide based on JIS K 1557, about the vinyl system polymer which has a unctional group at the and of Examples 1–8. The number of hydroxyl groups of the and introduced mentioned polymer of the preceding clause. The carboxyl cardinal number of the end of the vinyl quantity by using the ethanol solution of thymol blue for the toluene/methanol solution of this

0092] The amine cardinal number of the end of the vinyl system polymer which has a functional group at the end obtained in Example 10 depended on the same assay as a fixed quantity of the number of hydroxyl groups of Examples 1~8. The trimethoxysilyl cardinal number of the end of the vinyl system polymer which has a functional group at the end obtained in Example 11 and Example 12 computed veight which asked for the number of mols of the trimethoxysilyl group by 1H-NMR measurement, the number of the silyl group per one molecule of polymers from the number average molecular and was calculated by GPC. The vinyl group of the end of a vinyl system polymer which has a polymer as an indicator, and titrating with sodium hydroxide methanol solution.

unctional group at the and obtained in Example 13 depended on the same assay as a fixed quantity of the silyl cardinal number of Example 11 and Example 12.

... 2.0 1. 6 0 -SI(DCH,), 1. 73 -COOH 1. 7.0 -SICOGE.) 1. 8 0 -NH. HO H 0 --0 H 1. 74 -OH 1. 73. -OH H 0 -- 0 H 1.80 -OH 分子量分布 (Ne/Ne) 1. 70 1.50 1.55 1.59 1. 77 8500 4 7 0 0 5000 9 5 0.0 0 0 1 9 5 7 0 0 3 2 0 0 9 5 0 0 9006 0006 12000 6500 Table 2 63 * 搬 4

obtained in Example 1, the TORII range isocyanate additive (Japanese polyurethane company make.) reglected and passed through it under 25 ** and 55%RH, and the gel fraction was measured by the ydroxyl group mole-ratio (-NCO)/(-OH) =1.2, further, after adding the 2-% of the weight toluene of trimethylolpropane "The coronate L" was added so that it might be set to isocyanate group / constituent was produced. Some above-mentioned hardenability constituents were taken, it was ,0094](Example 14) To the vinyl system polymer 100g which has a functional group at the end solution 5g of dibutyltin dilaurate, this solution was fully stirred, it mixed and the hardenability applied on the polyethylene terephthalate (PET) film which carried out releasing treatment, it

[0095]On the PET film with a thickness of 38 micrometars by which corona discharge treatment was carried out, the above-mentioned hardanability constituent was applied so that the thickness after desiccation might be set to 25 micromaters, and stoving of it was carried out for 20 minutes in 150 rttp://www4.ipdl.inpit.go.jp/cgi-bin/tran_web_cgi-cjie?atw_u=http%3A%2F%2Fwww4.ipdl.i... 2010/03/03

** oven, and it produced the pressure sensitive adhesive sheet which has the adhesive layer over

[0096](Example 15) it changed to the TORII range isocyanate additive of trimethylopropans used in Example 14, and excapt having used diphenylmethane disocyanate, the hardenability constituent was

0097](Comparative exampla 1) It changes to the vinyl system polymer which has a functional group hydroxyl group. Except having used [Mn=10000, hydroxyl value (KOHmg/ \dot{g}) =11.4], the hardenability constituent was produced like Example 14 and the pressure sensitive adhesive sheet was produced. 0098](Comparative example 2) It changes to the vinyl system polymer which has a functional group constituent was produced like Example 14 and the pressure sensitive adhesive sheet was produced. obtained by Examples 14 and 15 and the comparative examples 1 and 2 and the obtained pressure at the end obtained in Example 1 used in Example 14, and is a polypropylene glycol of a both-ends at the end obtained in Example 1 used in Example 14, and is the polybutadiene of a both-ends hydroxyl group. Except having used [Mn=3090, hydroxyl value (KOHmg/g) =30.4], the hardenability 0099]The holding power and adhesive power of the gel fraction of the hardenability constituent produced like Example 14 and the pressure sensitive adhesive sheet was producad.

(0100]1. Holding power: based on JIS Z 0237, the inclination type ball tuck examination was done in 0

sensitive adhesive sheet were measured by the method shown below. A measurement result is shown

restored once, a 2-kg roller was stuck by pressure, and a 180-degree friction test was done by a part [0101]2. Adhesiva powar: based on JIS Z 0237, the sampla was stuck on SUS#304 steel plate, it was for speed-of-testing/of 300 mm under the environment of 25 ** and 55%HH after 20-minute care of health using the tension taster.

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0103]Compared with the hardenability constituent of the comparative examples 1 and 2 in which the polymer (P) was compounded from the vinyl system polymer which has a functional group similarly at conventional polypropylene glycol and polybutadiene of a both-ends hydroxyl group are used for the [0104](Example 16) The vinyl system polymer 100g which has a functional group at the end obtained in Example 2 was scaled in a 500-ml flask, and indirect desulfurization water was carried out at 120 that it may be set to isocyanate group / hydroxyl group mole-ratio (-NCO)/(-OH) =1.2, it stirred at ** under decompression of 5torr for 30 minutes. Diphenylmethane discoyanate is added to this so 80 ** for 4 hours, isocyanate end acrylic polymer (O) was compounded, and isocyanate end acrylic standup of a gel fraction, and it turns out that high holding power and adhesive power are shown. ardenability constituent of this invention, Examples 14 and 15 have a remarkable speed of the the end obtained in Example 3.

libutyltin dilaurate were kneaded, and adhesives were produced. On a 50-micrometer-thick OPP film, (0105)90 g of the above-mentioned acrylic polymer (O), 10g of acrylic polymar (P), and 0.1 g of

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the above-mentioned athesives are applied so that the thickness after desicoation may be set to 10 minorenters. The Sturnionneter-more study (or PPT in was temheted on it, it was neglected for seven days at 40 set by this state, the sample was orested, and I type friction test was done by a part for

(1000)Comparative exemple 3) The adjoin cold 5) It get 1/4-butendoil, 886 of 1/4-butendoil, and OlfoComparative exemple 3) The adjoin cold 5) It get 1/4-butendoil, 886 of 1/4-butendoil 886

Locations are stated in Upo manner to the area was remained to the convenience present system which the administration that the area was remained to the convenience with which the administration of the area polymer to the which has a functional group at the end obtained of the area polymer to the which has a functional group at the off the area of the

Example 3, the viryl system polymer 30g which has a functional group at the end obtained in Example 8, and "conotate L", 45g verse dissolved in the antially amendic solvent of 100 g of 200g of follower / dimedityfrommanique, and editesives were produced.

[10] 100 a 50-miscroneer-trick PET film, the obtained adhesives are applied so that the thickness

after desicockion may be set to 10 micronenteans. It defed for 10 minutes at 120 s*, and the 50micronenter—thick PET final was luminated on it, it was neglected for seven deys at 40 ** by the state, the sample was overed, and 1 type firston test was done by a part for speed or featurefor 300 mm unite partors. 1 type firston test was similarly done as no ill estateme to est about what immerced the abover-mentioned sample in 88 ** JIS No. 3 of futber processing oil bir 72 hours. A

immored the above-mentioned sample in 80 ** JIS No. 3 oil (rubbor processing oil) for 72 hours. A rest result is shown in Table 3.
(0) 10] Comparative osample 4) Two 50-micrometer-thick PET films were passed up for the

(0) (10) (Comparative example 4) Two 50-micrometer-thick PET films were passed up for the adherives obtained by the comparative example 3 like Example 17, the sample was created, and T type friction reast was done by a part for speed-of-treating/of 300 mm uning instrum. A text result is type friction to seek was done by a part for speed-of-treating/of 300 mm uning instrum. A text result is

thown in Table that the adhesives using the hardenshilty constituent of this invention of the Other memorine Example II have the oil resistance outstanding to the conventional polyester resistance adhesives shown in the commarative example.

(IOTI) (Examels 19) go or introversors mathersprise, or g or disciplination clarify the whole energy is got fethed proceeding of a refression mathersprise (Total Spieles (made in the National Angula proceeding 1, got for the properties (made in the National Angula proceeding 1, got fethed 1, got fethen 2, got 1, got fethed 1, got fethen 2, got fethen 2, got 1, got fethen 2, got fethen 3, got

ester caudit is obtained in Tubble 3.

Dit difficultures to example 3) it changes to the wind system polymer 10g which has a functional initial comparable to the property at the and chainled in Example 3.8 Except Margine and 10 get distribution-tytes of the artificion of the published in Example 3.8 Except Margine and 10 get distribution-confide addition of Exception 4.2, two kinds of addition's was produced like Example 18, the stricture likes for the wheats was person foresther animality, the sensible was created, and 17 type friction as the ask down by a part for exceed-of-testing-40, 400 mm using lattors. A test result is above in

Table 3. [OI 15] turns out that the adhesives using the hardenability constituent of this invention of the blove-mentioned Example 18 have the adhesive strength outstanding to the conventional 2 liquid

acrylic adhesives shown in the comparative example 5.

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JP,2001-163918,A [DETAILED DESCRIPTION]

(DI 18)Example 19 is acybe look (of the Dainpoun his denniska cornease make and "AKURURIKKU Darland 1973' 558 of solid content (1 500 ged), the thumin dioxde 100g, 80 ged deherofretheme dilacopamek, in 50 ged dekupful diamera, and 800 ged toleane, the vivily system poblems 50g which the facility of the Sig of the kylorid diamera, and 800 ged to leave, the vivily system poblems 50g which the facility and sea added to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 8, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting mixing was ended to the end debtained in Esemple 9, starting was ended to the end debtained in Esemple 9, starting was ended to the end debtained in Esemple 9, starting was ended to the end debtained in Esemple 9, starting was ended to the end debtained in Esemple 9, starting was ended to the ended to the ended of the ended was ended to the ended to the ended to the ended was ended to the ended to the ended to the ende

and the indensibility constituent (export eventues pearly are produced.)

(D11/2)On the ODP film with a thickness of 78 micrometers which carried cut corona discharge treatment of the aboven-mortificial indensibility constituent. It applied so that the thickness and the coast discharge the treatment of the aboven-mortificial indensibility constitution. It applied so that the thickness and the coast discharge the set of 28 micrometers, and it fields for 20 minutes in 101 st owns, and the coast. It the thickness where the set of 28 micrometers are the coast. It is owns and the coast. In 100 micrometers, and the coast out definition to the coast. In 100 micrometers are the coast out definition the set of other many and it is a delicitied to the coast. After following up the ODP film painted if below-mentioned is the unique of 100 degrees, the benefit that when the original size was done, and it examined visually other the which below mind the coast of coast and the coastant and the coast cocurred on the fold of the coast and evaluated in two stars, thing OD to which makes a white build mark for a coasted and thingses which the which build make and the coast and the coasted and thingses which the which build make and the coasted and thingses which the which build make and the coasted and thingses which the which build make and the coasted and thingses which the which build make and the coasted and thingses which the which build make and the coasted and thingses which the which the which the which we have the coasted and thingses which the which build make and the coasted and thingses which the which the which the which we have the coasted and thingses which the coasted and thingses which the which the

creck generated. The realist was about in Table 4.

[0118](Example 300) The inities of this hardenshifty constituent (exptis urethins paint) of Example 19.

Decreases the quantity for this hadings of the hardenshifty constituent of the hardens to the virty speem polymer 1908 which has a functional group at the cost obtained in Example 4. Except having used the virty system power 1908 which has a functional group at the cost of the proper proper and other property having used the virty system property 1009 which has a functional group for the and collaborated its group in the functional flux property of the property

Upoffermance was expected of miled. The result was about in Table 4, upoffermance was expected of miled and the result was about in Table 4, upoffermative receivable by the horizon of the hardwarding constitution (copying understood the Table 10 to 200 g, and Example 18. The quantity of the landings of karyle polyol was increased from 190g to 200 g, and Example 190 to 19

performance was evaluated similarly. The result was shown in Table 4, [0120]

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(光)	-	1	-	6 8 0	0 2 5	680 570 590 750 550 530 600	750	5 5 0	530	:
(銀位以後)	-	-	-	9-6	9 8	8 1	3.0	9.5	9 9	2 8

[012] It turns out that the earyfo uredrane paint using the hardenability constituent of this invention of Example 18 and Example 20 has the performance which was extremely excludent in both the effective property of a court, and bendality-proof as compared with the conventional angle underlied property of any other conventional angle underline paint of the comparable example 6 which did not use this so that more clearly than Table 4.

Configurance (2) To the vivily extens probleme 25% which has a functional group at the end obtained in the vivily extens polymer. The and Example 5 which have a functional group at the end obtained in Example 3. 25g of inpotence disosponates and 0.5 g of obtackful disurate were added, by the Michaelin integer was carried out for 20 minutes, and 20.0 se of the implication poly block coopolyments were produced.

0123]The 1-mm-thick sheet was produced using the pressing machine, and a physical-properties

http://www4.ipdl.inplt.go.jp/ogi-bin/tran_web_ogi_eijs?atw_u=http://www4.ipdl.i.____2010/03/03

of the weathering test was cerried out, and it was done. The test result was shown in Table 4. [0124](Example 22) The vinyl system polymer 50g which has a functional group at the end obtained in 301, using the sunshine weatherometer, under the environment of 50 ** and 65%RH, UV irradiation strangth retention) of a normal state were presented with the above-mentioned thermoplastic poly copolymer, a physical-properties examination and weathering test of a normal state were done like block copolymer. The above-mentioned physical-properties examination was done based on JIS K example 8, The vinyl system polymer 100g and 0.5 g of dibutyitin dilaurate which have a functional attaching separable covering, stirring wings, a three-way cock, and a tamperature probe, heating stirring was performed at 200 ** for 3 hours, the polycondensation was advanced, and the xamination (at the time of a fracture tensile fracture strength, elongation) and weathering test thermoplastic poly block copolymer was produced. About the obtained thermoplastic poly block colymerization vessel to 5torr, after scaling to four 1 liter-capacity mouth separable flask and roup at the end obtained in Example 9, Decompressing the inside of the above-mentioned Example 21. The test result was shown in Table 4.

and weathering test of a normal state were done like Example 21. The test result was shown in Table at 200 ** for 1 hour. Subsequently, decompressing to Storr, heating stirring was performed at 270 ** for 3 hours, the polycondensation was advanced, and the thermoplastic poly blook copolymer was bock, and a temperature probe, the inside of the above-mentioned polymerization vessel was stirred produced. About the obtained thermoplastic poly block copolymer, a physical-properties examination [0125](Comparative example 1) 50 g of naphthalene-dicarboxylic-acid dimethyl, the adipic acid 30g, After scaling 50g of ethylene giycol, and 0.5 g of titanium tetra isopropanal POKISAIDO to four 1 iter-capacity mouth separable flask and attaching separable covering stirring wings, a three-way

properties examination and weathering test of a normal state were done like Example 21. The test 0126](Comparative example 8) About the thermoplastic elastomer which consists of styrene outadiene styrene block copolymer (SBS, 35 % of the weight of styrene content), a physicalesult was shown in Table 4.

example 21 and Example 22 so that more clearly than Table 4, It turns out that it has the outstanding 0127]The acrylic thermoplastic elastomer using the hardenability constituent of this invention of compared with the conventional thermoplastic elastomer of the comparative example 7 and the physical properties and especially outstanding weatherproof performance of a normal state as comparative example 8 which did not use this.

sealing agent, a physical-proparties examination and weathering tast of a normal atate were done like [0128](Example 23) The vinyl system polymer 100g which has a functional group at the end obtained agent were produced for three days under the environment of 23 ** and 55%RH. About the obtained [0129](Comparative example 9) It changed to the viryl system polymer 100g which has a functional in Example 11, Kneading mixing of the calcium carbonate 70g, the titanium dioxide 30g, and 0.5 g of the dibutykin dilaurate was carried out by Plast Mill for 1 hour, and care-of-health Si and a sealing Example 21. The test result was shown in Table 4.

Example 23 except having used 100 g of polypropylene glycols of both-ends alkoxy silyl groups. About were done like Exemple 21. The test result was shown in Table 4. [0130](Comparative example 10) Both-ends hydroxyl group polypropylene glyco! [Mn=10000, hydroxyl the obtained sealing agent, a physical-properties examination and weathering test of a normal state group at the end obtained in Example 11 of Example 23, and the sealing agent was produced like

value (KOHmg/g) =11.4] Carry out stoving of the 100 g at 100 ** under decompression of 5torr, and [0131]It changed to the vinyl system polymer 100g which has a functional group at the end obtained diphenylmethane disocyanate is added so that it may be set to isocyanate group/hydroxyl group (mole ratio) =1,2 to this, it was made to react at 80 ** for 5 hours, and moisture curing type polypropylene-glycol polymer of the both-ends isocyanate group was produced.

in Example 11 of Example 23, and the sealing agent was produced like Example 23 except having used isooyanate group. About the obtained sealing agent, a physical-properties examination and weathering 100 g of moisture curing type polypropylene-glycol polymer of the above-mentioned both-ends 0132]It turns out that the sealing agent using the hardanability constituent of this invention of example 23 has the outstanding physical properties and especially outstanding wastherproof test of a normal state were done like Example 21. The test result was shown in Table 4.

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exampla 9 and tha comparative example 10 which did not use these so that more clearly than Table performance of a normal state as compared with the conventional sealing agent of the comparative

polymer 3.0g which have a functional group at the end obtained by this in Example 12 and also stirring was added to the 500-m flask by which the nitrogen purgs was carried out, and it was made to sir made distribute a distribute a floor follower and 50 g of methyl methosystes (MMA). After having added 0.1 is of azobiacischour nitrorial to these dispersion liquid, carrying out bubbling with a characteristic and bubbling with are distributed, After adding the toluene solution and 0.2 g of dibutyltin dilaurata of tha vinyl system 0134]It has a flowing-back condenser tube and agitating blades, and 3.0 g of obtained refining silica homogenizer, stir "Aeroail 200" and the 30-nm mean particle diamatar of 5.0 g for 1 hour, and thay for 3 hours, solid content was taken out by centrifugal separation, it washed 3 times by ethanol, 0133](Example 24) 100g of toluene, and silica (the product made by Japanese Aerosil.) With a vacuum drying was carried out at 80 ** for 2 hours, and refining silica was produced.

nitrogen gas and removing the dissolved oxygen in a system, it was made to polymerize at 60 ** for 8 hours, and silica restoration polymethylmethacrylate (PMMA) was produced. dried for 10 minutes at 110 **, and the silioa restoration PMMA film was produced. It was 90% when [0136](Comparative exampla 11) On the occasion of silica restoration PMMA production of Example 24, it changes to the viryl system polymer 3.0g which has a functional group at the end obtained in silica restoration PMMA was polymerized like Example 24, and the silica restoration PMMA film was measured, as compared with the silica restoration PMMA film using the vinyl system polymer which [0135]On the PRT film by which releasing treatment was carried out, the obtained PMMA toluene solution was applied so that the thickness after desicoation might be set to 10 micrometers, and it Example 12, Except having produced surface treatment allica using 2.0 g of octyl trimethoxysilane. produced. When the total light transmittance of the obtained silica restoration PMMA film was has a functional group at 78% and the end of this invention, it was remarkable and the optical the total light transmittance of the obtained silica rastoration PMMA film was measured. characteristic was low.

invention according to claim 1. Since it is constituted as mentioned above, by the chain extension not elongation or tensile strength is obtained, and it is used suitably for an adhesive, sealing agent, elastic construction using the molding material and hardenability constituent containing thase be a very good adhesives, paint, foam, film, thermoplastic-elastomer, sound deadener, various molding material, and chain extension and the reaction of hardening become certain and assy, and such reaction time is gel cost agent, artificial marble, etc. The vinyl system polymer which has a functional group at the [Effect of the Invention] The vinyl system polymer which has a functional group at the end of the and of this invention, It originates in the amide group which exists in the and of a polymera chain, only by reticulated-izing by bridge construction but an end functional group. Resin excellent in shortened, and let the workability and workability of fabrication operation or construction

oompatibilizer in a similar manner. [0139]The vinyl system polymer which has a functional group at the end of the invention according to [0138]The vinyl system polymer which has a functional group at tha and of the invention according to polymer. The outstanding resin which the superfluous increase in crosslinking density was controlled and balance was able to take is obtained, and it is used suitably for an adhesive, saaling agent, clastic aspecially in one end, Can do so the remarkable function which is not obtained with the conventional adhesives, paint, fosm, film, thermoplastio-elastomer, sound deadener, various molding material, and surface-active agent, and by coupling of the resin of a different presentation further. The so-called block polymer of an AB type can be compounded, and it can use effectively as a resin modifier or a low-molecular-weight type as the resin modifier which used the functional group for the end, or a claim 2, Since it is constituted as mentioned above, the viryl system polymer which does so the chain extension effect by the end functional group described above, and has a functional group paragraph, and by the chain extension by an end functional group as what is called star shape 0140]Since the vinyl system polymer which has a functional group at the and of the invention claim 3, Since it is constituted as mentioned above, can do so the effect indicated in front 2 gal coat agent, artificial marble, etc.

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according to claim 4 is constituted as montioned above, it makes remarkable outstanding performance described above among the vind system polymer which has a functional group at the

experientements destined to be on the properties of the properties

[0142]Since the virial system polymer which has a functional group at the end of the invention according to child in its constitution as mentioned above, it makes remarkable outstanding the performance described above among the virial system polymer which has a functional group at the performance described above among the virial system polymer which has a functional group at the

Old the invention abounding to claim?

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Old Silkness the wind system controlleg to claim?

In controlleg to claim? In contribute a mentioned about it makes the high related behavioration of location to controlleg to claim. The controlleg to claim the wind the wind for some the wind for some the wind to controlleg to claim the wind the wind for the controlleg to claim to the controlleg to claim to a full claim that it is described in the at it is described to the at the controlleg to claim is a controlleg to claim. So controlleg to claim is a functional as mentioned above. It makes the high relicion above among the virty system polymer winds semantical customers described above among the virty system polymer winds the as functional group at the end of the invention seconding to claim 1 to 6.

Silks claim to the contributes as mentioned above, it is ascollent in hardwring profit memors and cesticated above, it is ascollent in hardwring profit memors described above annote the virty system polymer winds in a functional group, it is not enough to the invention according to claim 1 to 6.

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excluded above. But channels they constituent of the invention according to all in 1° 1° constitution at (1018) since the but channels. The constituent of the invention according to all in 1° 1° constitutes and describendered allow constituent above constituent or a constituent or a constituent or a constituent of the invention according to constituent of the invention according to claim 18 is constituted as (1488) since the huntershifts constituent of the invention according to claim 18 is constituted as a hardward property or constituent above combining the coras ledging agent or chain deligation agent or claim deligation agent or chain deligation agent.

distributed above.

[Ol 50]Since the hard-enability constituent of the invention recording to claim 14 is constituted as mentioned above, it alrows the parformance outstanding in many uses which constitute and describe a lartendent above, it alrows the parformance outstanding in many uses which constitute and describe a lartendential constituent above combining the cross inking agent or chain olongation agent to the constituent above.

the indentibility constituent above combining the cross lividing agent or chain elengation agent described above.

To elengate the constituent of the inventor according to claim it is constituted as meritaned above, it shows the performance outstanding in may uses which constitute and describe meritaned above, it shows the performance outstanding in may uses which constitute and describe inventorable above.

mentioned above, it shows the performance outstanding in many uses which constitute and describe

[0151]Since the hardenability constituent of the invention according to claim 15 is constituted as

[[]Translation done.]